

From: [Jay Field](#)
To: [Burt Shephard/R10/USEPA/US@EPA](#)
Cc: [Eric Blischke/R10/USEPA/US@EPA](#); [Robert Gensemer](#); [Robert Neely](#); [Jennifer Peterson](#); [Robert Dexter](#)
Subject: Re: Statistical significance testing for reference envelope samples
Date: 11/06/2008 11:41 AM

Burt,
I've obviously missed a couple of emails/discussions, but would you please fill me in on (1) the "consensus for the BERA on the path forward for the bulk sediment chemistry part of the reference envelope sample definition, specifically, the lowest of the RSET SL1, PEL, PEC or consensus-based PEC chemical concentrations in sediment". Do you have a table with the chemicals included and the values that you could send me? (2) "Our recommended approach would also only eliminate those three samples identified a few days ago, at least if we believe the Query Manager results." what are the questionable results that you are referring to? are you using the most recent version of the database? Also, what is the universe of samples that is being considered for the reference envelope? only upstream samples or does it include all samples? a table with the list of potential reference envelope stations would be appreciated.
thanks,
Jay

Shephard.Burt@epamail.epa.gov wrote:

> Eric,
>
> Following up from a TCT call action item from yesterday, here's the
> recommendations from the MacDonald report, followed by where Bob
> Gensemer and I ended up on statistical significance testing on reference
> envelope samples. I'll start with Don MacDonald's original
> recommendations, followed by what Bob and I discussed Tuesday before the
> TCT call, and end up with a couple of things that happened after the TCT
> call yesterday afternoon that may have bearing on the final approach to
> be used.
>
> For the statistical comparisons of Portland Harbor site toxicity to
> reference envelope sediment toxicity, Don suggested one of two options,
> as described below.
>
> Candidate reference samples that meet the criteria for whole-sediment
> chemistry should be further evaluated to confirm that they were not
> toxic to sediment-dwelling organisms. More specifically:
>
> 1. Control-adjusted response rate should not exceed the MSD for each
> toxicity test endpoint; or,
> 2. In the absence of MSD values, control-adjusted response rate should
> not exceed the Tier II levels applied in the National Sediment Inventory
> (USEPA 2004)
>
> I think we have a consensus for the BERA on the path forward for the
> bulk sediment chemistry part of the reference envelope sample
> definition, specifically, the lowest of the RSET SL1, PEL, PEC or
> consensus-based PEC chemical concentrations in sediment.
>
> The remaining issue on reference envelope sample selection is the
> statistical comparison concern.
>
> After discussions Tuesday afternoon, Bob and I recommend the best path
> forward is to follow the spirit of Don's first recommendation to compare
> control-adjusted responses to minimum significant differences (MSD) for
> each of the four endpoints. However, MSDs have not yet been calculated
> for the Portland Harbor toxicity dataset so far as we are aware, and our
> position is that even if we had them, they are a fairly blunt tool
> compared to the sample by sample statistical significance tests we
> already have. Don's approach would require calculation of 4 MSD values,
> one for Chironomus mortality, one for Chironomus biomass, one for
> Hyalella mortality, and one for Hyalella biomass. Basically, Bob and I
> didn't think it's a good use of time to derive less precise statistics
> when the more precise site-specific statistics we already have can
> achieve the same purpose.
>
> The existence of site specific comparisons is the reason Bob and I felt
> that the second MacDonald recommendation (comparison to Tier II levels
> in a national sediment inventory) was not the best option for Portland
> Harbor. Since we have such a large site-specific dataset, use it
> instead of a non-site specific national dataset. Subsequent to the TCT
> call yesterday, Bob Gensemer talked with Don MacDonald. Don recommended
> the use of his second option, which appear to yield results similar to,
> but somewhat more protective than what would be obtained using the
> RSET-based proposal of LWG. Don didn't appear very enthusiastic about
> using the RSET definitions. The whole LWG proposal strikes me as a
> backdoor way to get RSET back into the Portland Harbor BERA, after we've
> spent so much time trying to keep it out. FYI, yesterday afternoon,
> also after the TCT call, during our monthly unit meeting, John Freedman
> (John Malek's replacement) gave a presentation about ocean dumping of
> dredged sediments. It quickly got into a RSET discussion, John agreed
> that the RSET guidelines weren't designed for use in an ecological risk
> assessment.
>
> The recommendation Bob and I had Tuesday was that instead of using MSDs

> as a threshold, for each of the samples that pass the sediment
> chemistry screen, we should eliminate any sample from the reference
> envelope for which either survival or growth for either species is
> statistically significantly different from their respective negative
> laboratory controls. That is a more precise test than using an overall
> MSD, would serve the same purpose, and would also eliminate the need in
> LWG's proposal to evaluate the weight of each individual organism
> relative to controls.
>
> Our recommended approach would also only eliminate those three samples
> identified a few days ago, at least if we believe the Query Manager
> results. LWG should confirm that.
>
> Best regards,
>
> Burt Shephard
> Risk Evaluation Unit
> Office of Environmental Assessment (OEA-095)
> U.S. Environmental Protection Agency, Region 10
> 1200 6th Avenue
> Seattle, WA 98101
>
> Telephone: (206) 553-6359
> Fax: (206) 553-0119
>
> e-mail: Shephard.Burt@epa.gov
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> "If your experiment needs statistics to analyze the results, then you
> ought to have done a better experiment"
> - Ernest Rutherford

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Jay Field
Assessment and Restoration Division
Office of Response and Restoration, NOAA
7600 Sand Point Way NE
Seattle, WA 98115-6349
(P) 206-526-6404
(F) 206-526-6865
(E) jay.field@noaa.gov